



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/678,544	10/04/2000	Seiichi Tenpaku	FUR0011-US	6515
28970	7590	02/10/2005	EXAMINER	
SHAW PITTMAN IP GROUP 1650 TYSONS BOULEVARD SUITE 1300 MCLEAN, VA 22102			LERNER, MARTIN	
			ART UNIT	PAPER NUMBER
			2654	
DATE MAILED: 02/10/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/678,544

Applicant(s)

TENPAKU ET AL.

Examiner

Martin Lerner

Art Unit

2654

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 to 4, 6 to 9, 11, and 16 to 18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3 and 4 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 6 to 9, 11, and 16 to 18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 October 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 6 to 9, 11, and 16 to 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Hutchins* in view of *Cooper et al.*

Concerning independent claims 1, 2, and 11, *Hutchins* discloses a speech synthesis apparatus and method, comprising:

“speech database storing means for storing sample waveform data in a speech unit and a speech database created by way of associating the sample sound waveform data with their corresponding phonetic information” – diphones are stored in a diphone waveforms 1130, where diphone waveforms are stored in random access memory or read-only memory; raw waveforms represent each diphone (column 21, line 13 to column 22, line 1: Figure 1);

“speech waveform composing means for dividing phonetic information into speech units upon receiving the phonetic information of speech sound to be synthesized, for obtaining sample speech waveform data corresponding to the each phonetic waveform information in a speech unit from the speech database, and for generating speech waveform data to be composed by means of concatenating the

Art Unit: 2654

sample speech waveform data in speech units” – dictionary look-up module 1010 looks up words of the input text in a word dictionary 1020 and retrieves their phonetic transcriptions (column 5, lines 50 to 66: Figure 1); phonetics extractor 1080 retrieves phonetic transcriptions from the dictionary (column 6, lines 57 to 66: Figure 1); waveform generator 1120 converts information in diphone and prosody arrays into a digital waveform that is suitable for conversion into audible speech by a diphone-by-diphone process (column 19, lines 28 to 40: Figure 1); waveform generator 1120 proceeds diphone by diphone by adjusting copies of the appropriate diphone waveforms stored in a diphone waveform look-up table 1130 to have specified pitch (column 8, lines 1 to 6: Figure 1); each adjusted diphone waveform is concatenated onto the end of the partial utterance until the entire sentence is completed (column 8, lines 5 to 9: Figure 1);

“analog converting means for converting the speech waveform data received from the speech waveform composing means into analog signals” – digital speech output waveform produced from the waveform generator 1120 can be passed to a D/A converter for immediate playback (column 24, lines 58 to 62: Figure 1).

Concerning independent claims 1, 2, and 11, *Hutchins* suggests that prosody generator 1100 handles pitch effects by computing a baseline pitch and adjusting pitch values. (Column 18, Line 32 to Column 19, Line 12: Figure 1) However, *Hutchins* omits pitch converting means for converting pitch by processing a waveform segment converging on a minus peak during a periodical unit of speech waveform data. Specifically, *Cooper et al.* teaches a frequency converter method, comprising:

“processing a segment of a waveform in which the waveform is converging on a minus peak during a periodical unit of speech waveform data, upon receiving the speech waveform data requiring pitch conversion” – signal modification circuit 50 adds or subtracts samples from an input signal 10 to perform pitch modification or pitch correction (column 8, lines 15 to 36: Figures 3 to 15); three insertion points were examined: peaks, zero crossing, and 30 degree lagging from zero crossing; a feature of the positive and negative peaks of a sine wave is that they are the location of minimum slope, or minimum first difference magnitude; insertion at the peaks gave lower distortion (column 8, line 57 to column 9, line 9: Figures 3 to 15); sample insertion or sample deletion at a negative peak is equivalent to “processing a segment of a waveform in which the waveform is converging on a minus peak”; an object is to allow real time frequency shifting of a input signal, for example, a human voice (“speech waveform data”) (column 2, lines 56 to 59); Figures 3 to 15 show “a periodical unit” of waveforms, e.g. one sine wave period.

Concerning independent claims 1, 2, and 11, *Cooper et al.* says that frequency conversion for audio by signal modification at a minus peak has the advantages of reducing harmonic distortion, providing reduced complexity of manufacture and operation, and permits the real time frequency shifting of the human voice. (Column 2, Lines 39 to 59) It would have been obvious to one having ordinary skill in the art to perform pitch adjustment at a minus peak as taught by *Cooper et al.* in the speech synthesis apparatus and method of *Hutchins* for the purpose of reducing harmonic distortion, providing reduced complexity, and permitting real time frequency shifting.

Regarding claims 6, 8, 16, and 18, *Cooper et al.* discloses three insertion points were examined: peaks, zero crossing, and 30 degree lagging from zero crossing; a feature of the positive and negative peaks of a sine wave is that they are the location of minimum slope, or minimum first difference magnitude; insertion at the peaks gave lower distortion (column 8, line 57 to column 9, line 9: Figures 3 to 15); thus, insertion at a zero crossing point corresponds to assigning “a larger processing value at around a zero crossing point and a smaller value is provided at a point farther from the zero crossing point”; insertion at zero crossing points corresponding to both positive and negative peaks is disclosed, so insertion at a zero crossing point associated with a negative peak corresponds to “waveform processing at around a zero crossing point is performed within the segment in which the waveform is converging on the minus peak”.

Regarding claims 7 and 17, *Cooper et al.* discloses signal modification circuit 50 adds or subtracts samples from an input signal 10 to perform pitch modification or pitch correction (column 8, lines 15 to 36: Figures 3 to 15); adding or subtracting samples for pitch modification corresponds to “wherein the pitch is one of shortened and lengthened by one of compressing and extending, respectively, the waveform along a time axis”.

Regarding claim 9, *Cooper et al.* discloses three insertion points were examined: peaks, zero crossing, and 30 degree lagging from zero crossing; a feature of the positive and negative peaks of a sine wave is that they are the location of minimum slope, or minimum first difference magnitude; insertion at the peaks gave lower distortion (column 8, line 57 to column 9, line 9: Figures 3 to 15); implicitly, insertion of

Art Unit: 2654

samples at a zero crossing leads to "inserting a substantial zero value segment" because samples have zero values at zero crossing points; adding or subtracting samples for pitch modification has a result of "to lengthen pitch" and "to shorten pitch", respectively.

### ***Response to Arguments***

Applicants' arguments submitted 08 October 2004 have been considered but are moot in view of the new grounds of rejection.

### ***Allowable Subject Matter***

Claims 3 and 4 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record does not disclose or suggest a speech synthesis apparatus and computer instructions, where various pitch lengths are stored for each speech unit and pitch lengths of speech waveform data in the speech database are prepared by modifying a contour of a waveform in which the waveform is converging on a minus peak during a periodical unit.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to Applicants' disclosure.

Art Unit: 2654

Eide et al. and Huang et al. disclose related art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin Lerner whose telephone number is (703) 308-9064. The examiner can normally be reached on 8:30 AM to 6:00 PM Monday to Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (703) 305-9645. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



ML  
6/23/04



**RICHEMOND DORVIL**  
**SUPERVISORY PATENT EXAMINER**